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**APPENDICES TO THE
FOURTH INTERIM REPORT
OF THE
FCC ADVISORY COMMITTEE ON
ADVANCED TELEVISION SERVICE**

Volume I

**Richard E. Wiley
Chairman**

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ORIGINAL
FILE

A

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MEMORANDUM OF UNDERSTANDING

The Federal Communications Commission ("FCC"), the Advisory Committee on Advanced Television Service ("Advisory Committee"), and the ATV testing laboratories [the Advanced Television Test Center, Inc. ("ATTC"), Cable Television Laboratories, Inc. ("CableLabs") and the Canadian Communications Research Centre ("CRC")¹] are engaged in a collaborative effort to bring about the implementation of advanced television ("ATV") service for the American public.

Three years ago, the FCC in conjunction with industry, launched a comprehensive plan to establish advanced television service. The Commission's primary goal in the ATV proceeding is to ensure the development of a technically excellent ATV service that will most efficiently meet the needs of terrestrial broadcasters, receiver manufacturers, cable television operators and, most important, consumers. As the Advisory Committee enters the active testing phase of its program for evaluating ATV transmission systems, we observe that substantial progress has already been made toward making the selection of a standard for advanced television service. The efforts of the Advisory Committee, the testing

¹ In this particular effort, CRC is joined by the Canadian Broadcasting Corporation, the Canadian Department of Communications, Leitch Video International and Telesat Canada.

laboratories, and other industry parties have significantly advanced the Commission's ability to assess the merits of ATV technical designs. In addition, system designers have made advancements in developing new technical schemes for transmitting ATV service.

The Commission has stated that it intends to complete action on this project as promptly as possible. This objective is a considerable undertaking that poses a number of formidable challenges. The FCC's stated intention is to select an ATV standard by the second quarter of 1993. The successful, on-time accomplishment of all of the tasks of the ATV project will require hard work, dedication, and cooperation on the part of all of those involved. To this end, the undersigned parties agree to resolve any disagreements or contingencies that may arise in a prompt and cooperative manner.

In order to meet these challenges and accomplish our goals, the Commission, the Advisory Committee, and the testing laboratories will continue to work together to complete, in a timely manner, the major tasks undertaken by each. This memorandum of understanding describes the role and activities of each of these parties in this process.

FCC

The FCC, consistent with its policy-making and other responsibilities, will continue to review the Advisory Committee's testing plans and procedures, including the plans and procedures for field testing. The FCC will assist the Advisory Committee and

testing laboratories in the testing process. This will include on-site observers and participants and participation on the "expert viewer panel." The FCC will contribute, as feasible, staff and mobile monitoring facilities for field testing. The FCC will also take all necessary steps, including the development of analytic tools, to prepare an allotment table and/or assignment plan for ATV channels. This will ensure that channels are available for ATV service in a timely manner.

Advisory Committee

The Advisory Committee will continue to refine the testing plans and procedures, including finalizing the data reporting formats and developing the plans and procedures for field testing. Through its oversight and direction, the Advisory Committee will continue to work with ATTC, CableLabs, and CRC to seek to carry out the established procedures within the established deadlines. The Advisory Committee will also continue to work with ATV system proponents to ensure the timely delivery of systems for testing. The Advisory Committee will continue to maintain close coordination with the Commission through regular contacts with key staff members and periodic meetings with the FCC Chairman.

The Advisory Committee will develop a plan for reviewing new technical advancements in the state of the art, not already provided by the ATV systems pre-certified by the Advisory Committee, that appear to offer important benefits to the public and are sufficiently concrete so as to be tested contemporaneously with the pre-certified systems. Accordingly, it will prepare a

report and recommendation to the Commission by early 1992, on whether any of these new developments should be tested and the impact such additional testing would have on the test schedule.

Subject to the provisions of this memorandum of understanding, the Advisory Committee will complete all of its work and submit its final report to the Commission by September 30, 1992.


Testing Laboratories

ATTC and CableLabs will make all reasonable efforts to carry out their laboratory testing activities (which do not include field testing) consistent with the plans and procedures established by the Advisory Committee and will coordinate with the CRC to seek to ensure the continuity and integrity of the ATV testing program. ATTC and CableLabs, in cooperation with the Advisory Committee Chairman, will maintain regular contact with the Commission and its staff. Results of tests performed by ATTC and CableLabs will be provided to the Commission on a prompt and regular basis.

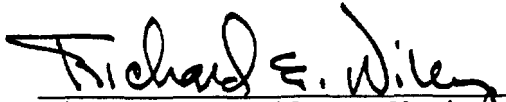
Consistent with the above, ATTC and CableLabs will seek to ensure that testing of proponents' systems certified for testing by the Advisory Committee begins in a timely manner and is completed so as to permit the Advisory Committee to deliver its final report to the FCC on time.

In summary, the essential intent of this agreement is to ensure that the research and work necessary for introducing ATV service to the American public is developed in a cooperative and efficient manner, and is not intended to create any obligations to


non-signatories or to alter in any way the obligations between ATTC
and CableLabs.



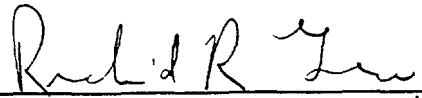
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Date: November 14, 1990

FOURTH INTERIM REPORT
OF THE
PLANNING SUBCOMMITTEE
OF THE
FCC ADVISORY COMMITTEE
ON
ADVANCED TELEVISION SERVICE

Joseph A. Flaherty
Subcommittee Chairman

March 1991

EXECUTIVE SUMMARY

This is the fourth interim report of the Planning Subcommittee of the FCC's Advisory Committee on Advanced Television Systems. In the Subcommittee's Third Interim Report, submitted in March 1990, several issues were identified as requiring expeditious resolution to permit testing to proceed as planned. Pursuant to the direction of the Advisory Committee, and thanks to the generosity and hard work of many individuals and firms, these matters have been addressed successfully. The testing of proponent systems, while postponed for several months, is now set to begin in a matter of weeks.

This report comprises work conducted by the Planning Subcommittee between January 1990 and January 1991. During this period, a substantial portion of the Advisory Committee's attention has been placed on making the final preparations for the onset of ATV tests. Nevertheless, most of the Planning Subcommittee's Working Parties have seen some activity.¹

Working Parties 1 and 2 (PS/WP-1, Technology Attributes and Assessment and PS/WP-2, Testing and Evaluation Specifications) met jointly to amend slightly in coordination with Systems Subcommittee Working Party 2, the ATV attributes list. Working Party 4 (PS/WP-4, Alternative Media Technology and Broadcast Interface) monitored activities of other organizations, and

¹Advisory Groups 1 and 2 (PS/AG-1, Creative Issues and PS/AG-2, Consumer and Trade Issues) were idle during this period.

identified issues for study by these groups concerning conditional access.

Working Party 5 (PS/WP-5, Economic Factors and Market Penetration) worked jointly with Systems Subcommittee Working Party 3 to further model ATV receiver penetration. With the benefit of independent studies from CBS and PBS, these working parties also made important contributions in better articulating the expected transitional costs which local broadcast stations might face in implementing a new ATV transmission system.

Previously, Working Party 7 (PS/WP-7, Audience Research) was able to develop a comprehensive research program to investigate consumer reactions to advanced television systems. Unfortunately, the research has not been executed due to lack of financial support from industry, foundation, or government sources.

Of all the components of the Planning Subcommittee, the busiest have been Working Parties 3 (PS/WP-3 Spectrum Utilization and Alternatives) and 6 (PS/WP-6 Subjective Assessment). PS/WP-3 began an intensive examination of issues related to the distribution of advanced television signals. The Working Party also continued its efforts to analyze the broadcast spectrum requirements of ATV systems, undertaking studies of ATV accommodation statistics under various conditions.

In addition, attention was placed on formulating an approach for evaluating and comparing the laboratory data of particular ATV systems, and the analytical tools needed in this regard are

already being developed. Finally, in response to a request from Systems Subcommittee Working Party 4 (ATV Standard), PS/WP-3 also created a list of spectrum-related attributes that a preferred ATV system should possess.

For its part, PS/WP-6 has been totally occupied with the many tasks associated with creating the ATV source material. Despite both the complexities inherent in producing more than a dozen scenes, "identical" in each of five video formats (four ATV and NTSC), and the lack of funding initially, the project has been completed successfully. The activity could not have been completed had it not been for the generosity of the proponents and the test labs and the very hard work of dozens of volunteers who worked together cooperatively on this important undertaking.

Although the Planning Subcommittee will experience a further dwindling of responsibilities as the testing and subsequent stages of the Advisory Committee's work commence, Working Parties 3, 5 and 6 will remain active. PS/WP-6 will administer the expert viewer panels that will be used in the ATV testing program. The viability of this effort hinges on these experts receiving adequate support, and it is envisioned that such support will be forthcoming from the respective organizations that employ these individuals. Members of the parent Advisory Committee that are employers of potential participants on the expert viewer panels are urged to commit support for this effort explicitly.

In addition, PS/WP-3 will analyze laboratory data and produce quantitative comparisons of the coverage and interference characteristics of the various ATV systems. The effectiveness of PS/WP-3's work would be enhanced significantly if the Advisory Committee were to define with specificity the importance that ought to be placed on particular ATV system attributes. In addition, the Advisory Committee is asked to confirm the goal of the Planning Subcommittee to develop actual channel assignment plans for terrestrial transmission of advanced television in the United States.

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I. INTRODUCTION

This is the fourth interim report of the Planning Subcommittee of the FCC's Advisory Committee on Advanced Television Service. The report can only summarize the tremendous amount of work performed by members of the Subcommittee between January 1990 and January 1991. A full accounting of this effort is reflected in the many documents which have been submitted to the Working Parties. The energy and dedication of all participants is gratefully acknowledged.

In addition to recapping the progress of the Subcommittee over the past 12 months, this Interim Report presents an overview of the work that remains. Advisory Committee attention is also directed to matters whose resolution could make the efforts of the Planning Subcommittee more effective.

The Report is organized as follows. The next section presents a brief summary of previous Subcommittee work. The third section describes the assignments each Working Party received, and section four details the progress made by the various Working Parties over the past 12 months. Section five outlines the remaining work of the Subcommittee, and Section six presents conclusions and offers recommendations to the Advisory Committee.

II. BACKGROUND

The accomplishments of the Planning Subcommittee in its previous phase of work (March 1989 to January 1990) were reported fully in the Subcommittee's Third Interim Report. In brief, they may be summarized as follows:

- Working Party 1 amended the list of ATV attributes to include ten new sets of characteristics. Working Party 2 reviewed these attributes and developed specifications for inclusion in the appropriate test plans.
- Working Party 3 initiated its assessment of auxiliary spectrum requirements, further defined the impact of taboos on spectrum availability, began coordination efforts with Canada and Mexico, and conducted a briefing for representatives of system proponents.
- Working Party 4 coordinated its earlier test plan and "multiport" receiver work with CableLabs and ATTC.
- Working Party 5 worked jointly with Systems Subcommittee Working Party 3 to further review the economic factors affecting ATV market demand and penetration.
- Working Party 6 made substantial headway toward developing the still and motion picture materials needed to conduct the subjective and objective tests.
- Working Party 7 reformatted four audience research study designs into RFPs.

III. NEW ASSIGNMENTS TO WORKING PARTIES FOR THE PERIOD JANUARY 1990 TO JANUARY 1991

At a meeting of the Planning Subcommittee Steering Committee held April 10, 1990, new work assignments were

developed for the various Working Parties. These tasks are summarized below.¹

A. Working Party 1: Technology Attributes and Assessment and Working Party 2: Testing Evaluation and Specifications

These two Working Parties were requested to meet jointly, and engage in three tasks. First, in coordination with SS/WP-2, the Working Parties were to ensure that the ATTC had complete audio and data channel test procedures prepared by July, 1990. Second, PS/WP-1&2 was assigned the job of developing a test methodology for the assessment of dynamic resolution provided by ATV transmission systems.

Finally, the two Working Parties were asked to define the scope and objectives for conducting field tests, and to solicit guidance from the FCC on this matter. In this regard, PS/WP-1&2 were required to coordinate with PS/WP-4 on cable related aspects of field testing, solicit proponents for characteristics of ATV transmitters, and coordinate this effort with PS/WP-3, and provide information obtained from these activities to SS/WP-2 Task Force on Field Test Procedures.

¹ No assignments were given to either Advisory Group 1 or 2 (PS/AG-1 Creative Issues and PS/AG-2 Consumer and Trade Issues).

B. Working Party 3: Spectrum Utilization and Alternatives

PS/WP-6 was assigned the following seven specific tasks:

1. Develop preliminary channel allotment plans and assignment options based on inputs from the Systems Subcommittee and WP-3 developed planning factors.
2. Examine the benefits of co-location of ATV transmitters.
3. Develop necessary tools to characterize interference between NTSC and ATV, and recommend mutual interference reduction measures such as co-location.
4. Complete work on identifying the availability of spectrum to support ATV broadcast auxiliary operations (including satellite, STL, and ENG). Identify alternative auxiliary support strategies, such as fiber optics.
5. Develop a strategy to reduce data obtained from impairment testing to obtain meaningful evaluations of ATV transmission systems.
6. Coordinate with the Implementation Subcommittee on the evaluation of the economic implications versus the technical implications of adopting various simulcast allocation plans.
7. Coordinate with PS/WP-1 and PS/WP-2 to obtain transmitter characteristics from ATV system proponents.

C. Working Party 4: Alternative Media Technology and Broadcast Interface

PS/WP-4 was given three additional duties: 1) Review EIA/ATSC recommendations regarding multiport specifications and, if appropriate, prepare a report to the Advisory

Committee Chairman; 2) Research potential compatibility conflicts between future Direct Broadcast Satellite systems and terrestrial ATV broadcast systems; and, 3) Coordinate with PS/WPs 1&2 to ensure that the field test plan encompasses end-to-end cable system testing.

D. Working Party 5: Economic Factors and Market Penetration

PS/WP-5 was asked to: 1) Estimate costs to convert present NTSC stations to ATV simulcast operation, basing equipment costs on a competitive market place; 2) Develop a family of market penetration projections in conjunction with SS/WP-3; and, 3) Investigate the implications of ATV policies for industrial development and international trade.

E. Working Party 6: Subjective Assessment

PS/WP-6's primary work assignment was to deliver still and dynamic video source material to ATTC in advance of the start of testing.² In support of this assignment, several tasks were identified:

1. Re-shoot, digitize and approve still test materials. Obtain rights to the test materials in writing.

² The original work assignment specified delivery to ATTC on or before September 1, 1990. This date was postponed because of the later than expected delivery of the format converter.

2. Complete the camera tests for 1050/59.94/2:1, 787.5/59.95/1:1 and 525/59.94/1:1 formats.
3. Test the telecine to be used for transfer of 35mm, 24fps film.
4. Conduct the source material production methods demonstration. Priority is to demonstrate four identical serially shot sequences and sequences shot in 1125/60/2:1 converted to 1050/59.94/2:1 and 525/59.94/1:1.

As discussed below, PS/WP-6 addressed each of these matters successfully.

F. Working Party 7: Audience Research

Working Party 7 was asked to pursue funding for the audience research studies it had proposed and to monitor the activities of SS/WP-2 Task Force on Field Test procedures for possible equipment to be used for audience testing.

IV. PROGRESS REPORT OF THE PLANNING SUBCOMMITTEE

The Planning Subcommittee addressed all of the matters described above and essentially accomplished all of the objectives it established for itself. This section summarizes the specific progress made by the various working parties in the period January 1990 to January 1991.

A. Progress Report of Working Party 1: Technology Attributes and Assessment and Working Party 2: ATV Testing and Evaluation Specifications

The Working Parties agreed to address the following matters:

1. The need to supplement the testing of audio channels in the digital domain, and the objective testing of audio channels in the analog domain by subjective assessment;
2. Testing of image dynamic resolution;
3. Testing of compatible systems;
4. The use of "Showscan" 70mm film material;
5. Test method for ATV into IDTV receivers;
6. The use of pre-enhanced video material for testing;
7. Consider deleting the chroma resolution requirement in Section 6.2, and;
8. Source signal processing.

All of these matters were resolved through a series of joint meetings of the two Working Parties that were held on 29 May, 6 July, and 8 October, 1990. A summary of the findings on the above matters follows.

1. While objective testing of audio channels in both the digital and analog domain generally reveals the system's characteristics, such tests should be supplemented by subjective tests conducted by a panel of experts. The List of Attributes was amended. It was reaffirmed that the minimum audio service in an ATV system should be that required in current NTSC practice, i.e., one stereo audio pair,